## REMARKS

Claims 1-27 were pending in this application.

Claims 1-27 have been rejected.

Claims 1, 5-7, 11, 14, 15, 18, 22, 23, 26, and 27 have been amended as shown above.

Claims 1-27 remain pending in this application.

Reconsideration and full allowance of Claims 1-27 are respectfully requested.


### I.    STATUS OF CLAIMS

The Office Action states in the "Response to Arguments" section that the § 101 rejection

of Claims 1-27 has been maintained. (*Office Action, Page 10, Section 9*). This appears to be

incorrect. The Office Action rejects the various claims under 35 U.S.C. § 102 and § 103. The

Office Action never rejects the claims under § 101. However, because the Office Action states

that the § 101 rejection has been maintained, the Applicant responds to the Office Action's

"Response to Arguments" section in Section II below.

The Applicant respectfully requests clarification in the next Official communication as to

whether Claims 1-27 stand rejected under 35 U.S.C. § 101.


### II.    REJECTION UNDER 35 U.S.C. § 101

The Office Action asserts that Claims 1-27 do not produce a "useful, tangible, and

concrete result." In particular, the Office Action asserts that the claims do not enable their

usefulness to be realized since "there is only calculation, generation, and decomposition of

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matrices and projections and there is no display or tangible output [of] the matrices or projections." The Office Action also asserts that the claims "at best are directed towards software *per se* which is nonstatutory." (*Office Action, Page 11, First paragraph*).

First, to be "useful," a claimed invention must simply satisfy the utility requirement under § 101. (*MPEP § 2106*). Here, there is no "lack of utility" rejection under § 101, so the Patent Office must believe that the claimed invention has some utility. Moreover, one utility for the claimed invention (at least partially isolating one portion of a signal from another portion of a signal associated with a disturbance or at least partially isolating a disturbance effect in a signal) is specific, substantial, and credible. The Patent Office has provided no evidence that this utility is not specific, not substantial, or not credible. As a result, the subject matter recited in Claims 1-27 produces a "useful" result.

To be "tangible," a claimed invention needs to set forth a "practical application of [a] judicial exception to produce a real-world result." (*MPEP § 2106*). Every single claim in this application recites using a matrix or a projection to perform a real-world function that produces a real-world result. Claims 1, 11, 18, and 26 recite using (i) a projected matrix, (ii) an orthogonal matrix and an upper triangular matrix, or (iii) a projection of a matrix to at least partially isolate a "first portion" of a second signal from a "second portion" of the second signal (where the "first portion" is associated with a first signal and the "second portion" is associated with at least one disturbance). Claim 27 recites using an orthogonal matrix and an upper triangular matrix to at least partially isolate "one or more effects of one or more disturbances in a signal." Every single one of these claims involves a "practical application" (the isolation of part of a signal from

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another part of the signal or the isolation of one or more disturbance effects in a signal) to produce a "real-world result" (an isolated signal with less noise, disturbance, etc.).

Second, the Office Action incorrectly asserts that "there is only calculation, generation, and decomposition of matrices and projections" in the claims. As shown above, the claims clearly recite using a matrix or projection to perform some function.

Third, none of the claims is directed to software *per se*. Claim 11 is an apparatus claim reciting "at least one memory" and "at least one processor." Claim 26 is a system claim reciting a "monitored system" and a "controller." Neither of these claims could possibly represent software *per se*. Claim 18 recites a computer program "embodied on a computer readable medium and operable to be executed by a processor," so Claim 21 is not software *per se*. Claim 1 recites "receiving a matrix," "projecting the matrix," and "using the projected matrix," which are steps that cannot be performed by software *per se* (although these steps could be performed by software when executed). Similarly, Claim 27 recites "performing canonical QR-decomposition on a matrix" and "using the orthogonal matrix and the upper triangular matrix," none of which can be performed by software *per se* (while these steps could be performed by software when executed).

Accordingly, the Applicant respectfully requests withdrawal of the § 101 rejection.


## III.  REJECTION UNDER 35 U.S.C. § 102

The Office Action rejects Claim 27 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2005/0015205 to Repucci et al. ("*Repucci*"). This rejection is respectfully

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traversed.

A prior art reference anticipates a claimed invention under 35 U.S.C. § 102 only if every element of the claimed invention is identically shown in that single reference, arranged as they are in the claims. (*MPEP § 2131; In re Bond, 910 F.2d 831, 832. 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990)*). Anticipation is only shown where each and every limitation of the claimed invention is found in a single prior art reference. (*MPEP § 2131; In re Donohue, 766 F.2d 531, 534, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985)*).

Claim 27 has been amended to recite performing canonical QR-decomposition on a "matrix," where the matrix includes "a first column Hankel matrix in a first portion of the matrix and a second column Hankel matrix in a second portion of the matrix." *Repucci* lacks any mention of using a matrix formed from "a first column Hankel matrix in a first portion of the matrix and a second column Hankel matrix in a second portion of the matrix." As a result, *Repucci* fails to anticipate all elements of Claim 27.

For these reasons, *Repucci* fails to anticipate the Applicant's invention as recited in Claim 27. Accordingly, the Applicant respectfully requests withdrawal of the § 102 rejection and full allowance of Claim 27.

## IV.    REJECTION UNDER 35 U.S.C. § 103

The Office Action rejects Claims 1-4, 11-13, 18-21, and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2003/0061035 to Kadambe et al. ("*Kadambe*") in view of *Repucci*. The Office Action rejects Claims 5-7, 14, 15, 22, and 23 under

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35 U.S.C. § 103(a) as being unpatentable over *Kadambe* and *Repucci* in view of Ku et al., "Preconditioned Iterative Methods for Solving Toeplitz-Plus-Hankel Systems" ("*Ku*"). The Office Action rejects Claims 8-10, 16, 17, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over *Kadambe* and *Repucci* in view of U.S. Patent Publication No. 2003/0004658 to Bechhoefer et al. ("*Bechhoefer*"). These rejections are respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP § 2142; In re Fritch, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)*). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP § 2142; In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)*). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP § 2142; In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)*). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); In re Grabiak, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)*).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)*). To establish a *prima facie* case of

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obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (*MPEP § 2142*).

Claims 1, 11, 18, and 26 have been amended to recite that a matrix includes "(i) a first column Hankel matrix comprising [a] first plurality of samples in a first portion of the matrix and (ii) a second column Hankel matrix comprising [a] second plurality of samples in a second portion of the matrix."

*Repucci* fails to disclose any type of matrix formed in this way.

*Kadambe* recites a system that stores a matrix X representing input from sensors and a matrix V representing noise, and the system iteratively determines an optimized matrix $\hat{S}$ and an optimized matrix $\hat{A}$. (*Par. [0021]*). The matrix $\hat{A}$ represents a mixing matrix and can be generated by transforming the matrix X into the "sparse domain." (*Par. [0022]*). The matrix $\hat{S}$ represents a source signal estimate matrix. (*Par. [0021]*). None of these matrices represents a matrix that includes "(i) a first column Hankel matrix comprising [a] first plurality of samples in a first portion of the matrix and (ii) a second column Hankel matrix comprising [a] second plurality of samples in a second portion of the matrix."

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*Ku* recites a technique for solving a system of equations using a Toeplitz-plus-Hankel matrix. (*Page 109, Abstract*). A Toeplitz-plus-Hankel matrix represents the sum of a Toeplitz matrix and a Hankel matrix. (*Page 110, Left column, Section 2*). The Toeplitz-plus-Hankel matrix of *Ku* does not, in any way, represent a matrix that includes "(i) a first column Hankel matrix comprising [a] first plurality of samples in a first portion of the matrix and (ii) a second column Hankel matrix comprising [a] second plurality of samples in a second portion of the matrix."

For these reasons, the proposed *Kadambe-Repucci* combination and the proposed *Kadambe-Repucci-Ku* combination fail to disclose, teach, or suggest the Applicant's invention as recited in Claims 1, 11, 18, and 26 (and their dependent claims).

Accordingly, the Applicant respectfully requests withdrawal of the § 103 rejections and full allowance of Claims 1-26.

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## SUMMARY

The Applicant respectfully asserts that all pending claims in this application are in condition for allowance and respectfully requests full allowance of the claims.

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@munckbutrus.com*.

The Commissioner is hereby authorized to charge any fees connected with this communication (including any extension of time fees) or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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